

Exhibit 4

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF SOUTH CAROLINA
COLUMBIA DIVISION**

THE SOUTH CAROLINA STATE
CONFERENCE OF THE NAACP, and

TAIWAN SCOTT, on behalf of himself and
all other similarly situated persons,

Plaintiffs,

v.

THOMAS C. ALEXANDER, in his official
capacity as President of the Senate; LUKE A.
RANKIN, in his official capacity as
Chairman of the Senate Judiciary Committee;
JAMES H. LUCAS, in his official capacity as
Speaker of the House of Representatives;
CHRIS MURPHY, in his official capacity as
Chairman of the House of Representatives
Judiciary Committee; WALLACE H.
JORDAN, in his official capacity as
Chairman of the House of Representatives
Elections Law Subcommittee; HOWARD
KNAPP, in his official capacity as interim
Executive Director of the South Carolina
State Election Commission; JOHN WELLS,
Chair, JOANNE DAY, CLIFFORD J.
EDLER, LINDA MCCALL, and SCOTT
MOSELEY, in their official capacities as
members of the South Carolina Election
Commission,

Defendants.

**Case No. 3-21-cv-03302-MBS-
TJH-RMG**

**Congressional Rebuttal Expert
Report of Dr. Jordan Ragusa**

May 4, 2022

Overview

I was asked by plaintiffs’ counsel to evaluate the report of Sean Trende, an expert for the defendants in this matter. At the heart of Trende’s report is a comparison of South Carolina’s newly enacted congressional map to the map drawn after the 2010 Census. Trende often refers to the prior map as the “benchmark plan” and the new map as the “enacted plan.” In his report, Trende relies on a mix of summary statistics and demographic data.

Trende finds that the new map splits fewer counties, from 12 to 10, and repairs several split voting tabulation districts, from 65 to 13 (pg. 10). Trende also notes that the enacted plan, like its predecessor, contains equipopulous and contiguous districts (pg. 10) and keeps incumbents in the same district (pg. 21). Finally, Trende concludes that the enacted plan is roughly equivalent to the benchmark plan on common measures of compactness (pgs. 19-20). I do not challenge any of these summary statistics.

Trende also reviews demographic data on the districts. He concludes that the redrawn map “generally reflects only modest changes from the map that was in effect from 2012-2020” (pg. 35). For example, Trende notes that the 7th district keeps 99.96% of its prior population, a statistic he calls the district “core.” I do not dispute this characterization of the 7th district; in fact, my report reached the same conclusion with different data.¹ I do, however, challenge two of Trende’s claims regarding the 1st district: that it maintains a “large share” of its core (pg. 18) and that the redrawn map has a “minimal effect” on the district’s racial composition (pg. 35).

CD #1 Core Retention

A key component of Trende’s report concerns “core retention.” Trende defines core retention as “the percentage of a district’s residents who are kept in a district from one redrawing to the next” (pg. 17). His data show that five of the seven districts (CDs #2-5 and CD #7) maintain 94% or more of their pre-redistricting population, with three of the seven above 98% core retention. Once again, the 7th district tops the list, maintaining 99.96% of its prior population. Trende refers to these five districts as having “very high” core retention rates (pg. 18). In contrast, by Trende’s estimates, the 1st district keeps 82.8% of its core while the 6th district keeps 87.6% of its core (pg. 18). Trende refers to these two districts as retaining a “large share” of their pre-redistricting population (pg. 18).

Critically, however, Trende never defines what would qualify as “low” population maintenance, nor does he compare his core retention statistics to some baseline. Of course, no statistic is inherently high or low. As they say, context matters. For example, Trende also notes that the 1st district’s 82.8% core retention rate translates to 140,489 residents who were drawn out of the district (pg. 18). Is 140,489 a large number? I believe it is, in one very important context.

In the 2018 midterm election in the 1st district, Democrat Joe Cunningham defeated Republican Katie Arrington by just 3,982 votes, or about 1% of the total votes cast.² Cunningham was the first Democrat to win election in the 1st district in forty years. Two years later, Cunningham would lose

¹ See “Expert Report Evaluating South Carolina’s Congressional Map” dated April 11, 2022. At the heart of my report is an examination of how the precincts were moved between districts. On page 7, I explain that the 7th district is notable for how few precincts were altered during redistricting.

² I obtained these data from SCVotes.gov, the official website of the South Carolina Election Commission.

reelection to Republican Nancy Mace by just 5,415 votes, again about 1% of the total votes cast.³ Despite a slight Republican lean, by 2020 the district had become South Carolina's only competitive district.

I raise this issue because the margin of victory in the 1st district in the two most recent elections is a small fraction of the population that was drawn out of the district during redistricting.⁴ Once again, whether a statistic is high or low requires additional context, and in this context the district lost a large and likely consequential portion of its core. I focus on whether Black voters were disproportionately drawn out of the district in the next section.

Another way to think about core retention is to consider the counties that comprise a district. Indeed, what constitutes a district's "core" is also a geographic question. On this matter, Trende says that "South Carolina's district cores have remained surprisingly consistent over the past century." (pg. 10). He arrives at this conclusion by looking at district maps dating back to 1902. In the case of the 1st district, Trende concludes that "Going back to the early 1900s, the 1st District was anchored in Charleston." (pg. 10).

A natural question arises: Is the 1st district *still* anchored in Charleston? I believe the answer is no. Table 1 on the next page presents the 1st district's voting age population by county before and after redistricting. In the columns labeled old and new "VAP" is the county's total voting age population while the columns labeled old and new "Percent" is the county's VAP divided by the total voting age population in the district.

Prior to redistricting, 38% of the 1st district's voting age residents were in Charleston County, 15% greater than the next largest county, Berkeley, at 23%. After redistricting, however, not only does Berkeley County eclipse Charleston with 30% of the new district's voting age population, but Charleston County now ranks *third* for the most populous portion of the district. In the redrawn map, Beaufort County makes up 27% of the 1st district's voting age population compared to Charleston County's 25%. In total, Charleston County's share of the district's voting age population shrunk by 13% as a result of the redrawn map.⁵

All in all, I do not share Trende's view that the 1st district retains a large portion of its core. Despite the 83% population retention statistic he cites, the raw number of voters drawn out of the district is quite large, especially when considered in the context of recent elections. Given the competitiveness of the 1st district in recent election cycles, seemingly subtle changes in who was added to or removed from the district could affect election outcomes over the subsequent decade.⁶ I explore this issue in

³ Finally, according to survey data from the Cooperative Election Study, in these two contests over 95% of Black respondents from the 1st district said they preferred Cunningham to his Republican opponents. I obtained these data from the CES website: <https://cces.gov.harvard.edu/>.

⁴ As noted later in my report, the 140,489 residents moved into the 6th district translates to 113,531 residents of voting age.

⁵ I presume Trende's point about the 1st district core is in reference to Charleston County. However, my critique applies to the City of Charleston as well. As Trende notes, the entire city peninsula (considered downtown Charleston) is now in the 6th district, as is the most populated portion of the city, West Ashley (pg. 33). According to the City's "Fast Facts," these two portions comprise 69% of the city's total population. I obtained these data from the city's website: <https://www.charleston-sc.gov/106/Demographics>.

⁶ Although Trende acknowledges that changes in the partisan makeup of the district "likely moved the district out of competitive territory and into reliably Republican territory, at least in the short term," he dismisses

more detail in the next section, specifically as it relates to the ability of Black voters elect candidates of their choice. Further, Trende’s claim that the state’s cores have remained consistent for a century is contradicted by the fact that Charleston County—the district’s “anchor” in Trende’s own words—now ranks third for the largest county share of the district voting age population.

Table 1: CD #1 County Cores

<u>County</u>	<u>Old</u> <u>VAP</u>	<u>Old</u> <u>Percent</u>	<u>New</u> <u>VAP</u>	<u>New</u> <u>Percent</u>	<u>Change</u>
Jasper	0	0%	4,368	1%	+1%
Colleton	1,186	<1%	2,099	<1%	0%
Dorchester	105,017	16%	94,831	17%	+1%
Beaufort	142,046	22%	151,768	27%	+5%
Berkeley	150,383	23%	173,949	30%	+7%
Charleston	242,758	38%	143,523	25%	-13%
District Total	641,390		570,538		

CD #1 Racial Composition

I now examine how the redrawn map affects the racial composition of the 1st district. On this topic, Trende relies on two comparisons.

At the end of his report, Trende compares residents who were removed from the 1st district to those in Charleston and Dorchester counties (pg. 35). As Trende notes, 113,531 residents of voting age were drawn out of the 1st district and into the 6th district, all of them from these two counties. Trende reports a BVAP of 22.5% in Charleston and Dorchester counties, compared to a BVAP of 23.4% of residents drawn out of the 1st district. Based on these statistics, Trende concludes that “the net effect of these moves on the racial composition of these districts is minimal.” (pg. 35).

I believe this comparison paints an incomplete picture as to how the redrawn map affects the racial composition of the 1st district. First, I believe Trende’s estimate uses the wrong denominator in one of his calculations, and second, Trende’s data suffer from a conceptual flaw: they focus on the choices mapmakers *made* and do not consider the choices they *could have* made.

On the first point, recall that Trende compares voters in Charleston and Dorchester counties to those drawn out of the 1st district. In this comparison, the percentages are similar. It is important to keep in mind, however, that sizable portions of both counties were in the 6th district prior to redistricting. Furthermore, these portions of the 6th district have more than double the percentage

changes in the district’s racial composition district as “minimal” (pg. 35). I focus on this matter in the second section of my rebuttal.

of Black voters compared to the portions in the 1st district.⁷ Trende's denominator includes these voters in the county BVAP calculation, thus inflating his baseline statistic.

A better comparison, in my view, is to focus on the portions of Charleston and Dorchester counties that were *within* the 1st district prior to redistricting. Doing so provides an apples-to-apples comparison. After all, if the question is how the redrawn map affects the racial composition of the 1st district, why include voters outside the district, especially when most of those voters remained outside the district even after redistricting?⁸

If we recalculate Trende's estimates but focus on the 1st district's portions of the two counties, we find that Black voters were disproportionately drawn out of the 1st district. Of the 347,775 voting age residents in the 1st district in Charleston and Dorchester counties under the old map, 61,395 were Black, making the baseline BVAP 17.7%.⁹ Of the 113,531 residents of voting age who were removed from the district from these two counties, 27,626 are Black, making the BVAP for those drawn out of the 1st district 24.3%. In other words, Black voters were 6.6% more likely to be removed from the 1st district compared to their proportions in Charleston and Dorchester counties within the district.

On the second point, Trende's focus on Charleston and Dorchester treats mapmakers' decision to remove voters from these two counties (and not others) as a given. I believe this is conceptually flawed. Table 2 below lists the BVAP in the 1st district prior to redistricting, divided among its five counties. In total, there were 110,761 Black residents of voting age in the old district. We can see that Black voters were not evenly distributed across the counties, however. Charleston County tops the list, with 37,855 Black voters in the prior district configuration, followed by Berkeley (31,227), Dorchester (23,540), Beaufort (18,093) and Colleton (46) counties.

Critically, the voting age population removed from the 1st district correlates (albeit only roughly) with the pre-redistricting BVAP noted in the prior paragraph. Table 2 lists these data in the second column. "VAP Removed" is the county's number of voting age residents (of any race) drawn out of the district divided by the total voting age population in the district and county.¹⁰ Charleston County once again tops the list, with 42% of its 1st district voting age residents moved to the 6th district by the redrawn map. At the other end of the spectrum, the two counties with the lowest Black voting age population in the district (Colleton and Beaufort) kept 100% of their voting age residents. Simply put: If we focus on just Charleston and Dorchester counties, we ignore portions of the district that mapmakers could have selected for removal but decided to leave intact.

⁷ According to the data, 42.8% of the voting age population of Charleston and Dorchester counties in the old 6th district are Black, compared to 17.7% of the portions of these counties in the 1st district.

⁸ According to the data, just 4,110 residents of voting age were moved from the 6th district into the 1st district from Charleston and Dorchester counties.

⁹ I list the total voting age population in the 1st district in each of the counties (the denominator) in Table 1 above. I list the BVAP in the district in each of the counties (the numerator) in Table 2 below.

¹⁰ Dorchester County had 105,017 voting age residents prior to redistricting and 12,584 drawn out (or 12% removed) while Charleston County had 242,758 voting age residents prior to redistricting and 100,947 drawn out (or 42% removed).

Table 2: CD #1 County BVAP and Population Removed

<u>County</u>	<u>Old BVAP</u>	<u>VAP Removed</u>
Colleton	46	0%
Beaufort	18,093	0%
Dorchester	23,540	12%
Berkeley	31,227	0%
Charleston	37,855	42%
Total	110,761	

Looking at the data in their entirety, as opposed to just two of the five counties, we once again see that Black voters were disproportionately drawn out of the 1st district. As noted earlier, 27,626 Black voters were removed from the 1st district, comprising 24.3% of the 113,531 total voting age residents who were drawn out. By comparison, the BVAP for the 1st district prior to redistricting was 17.3%.¹¹ In other words, there is a 7.0% gap between the 1st district's old BVAP and the portion drawn into the 6th district (slightly larger than the 6.6% statistic for the portions of Charleston and Dorchester counties in the district).

It is worth noting that my initial report identified this disparity.¹² At the heart of my report are three statistical models that examine the VTDs selected for each of the redrawn districts. In the second of the three models, I examined whether race, partisanship, or precinct size explain which VTDs were removed from each district.¹³ At issue in this analysis is whether the VTDs moved out of the redrawn districts differ in systematic ways from those kept in the district. Table 3, below, reproduces the results of this analysis for the 1st district.

In this analysis the BVAP variable is statistically significant and positive, indicating that VTDs with a large Black population were more likely to be moved out of the 1st district. In a subsequent calculation in my original report, I show that VTDs with 100 Black voters had only a 13% chance of being moved out of the 1st district, compared to 60% for VTDs with 1500 Black voters (pg. 5).

¹¹ I present the pre- and post-redistricting BVAP for each district in Table 4 at the end of this report.

¹² See "Expert Report Evaluating South Carolina's Congressional Map" dated April 11, 2022.

¹³ I measure a precinct's racial composition using publicly available Census data from 2020. Specifically, I record the Black voting age population (labeled BVAP) of each VTD in the state. In the calculation I include any person who self-identified as Black, including Black in combination with any other category. I also include a variable in my analysis that records each precinct's total voting age population (labeled Total VAP). Lastly, I measure partisanship using the number of votes for Joe Biden in the 2020 general election (labeled Biden Vote). I obtained these data from SCVotes.gov, the official website of the South Carolina Election Commission. Additional details can be found in my prior report.

Table 3: Analysis of CD #1

<u>Variables</u>	<u>Model 2 VTDs Moved Out</u>
Biden Vote	0.39***
BVAP	0.18***
Total VAP	-0.14***
Constant	-2.06***
N	369

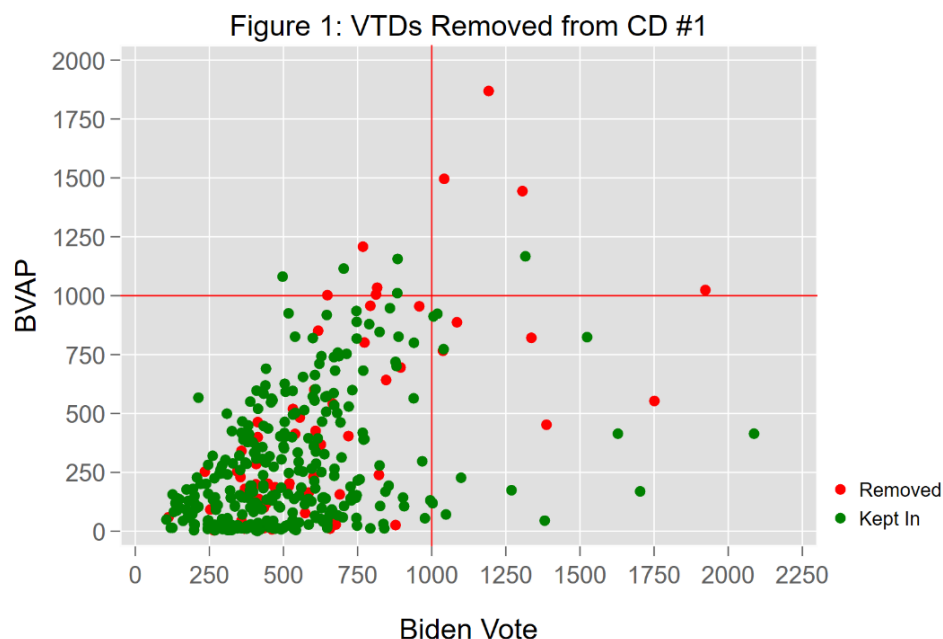
*** p<0.01, ** p<0.05, * p<0.1

Although my report does not focus on partisanship, it is notable that the Biden Vote variable is also statistically significant and positive in the analysis. In other words, the results indicate that *both* Black and Biden voters were disproportionately removed from the 1st district. As noted in footnote 6 above, Trende only acknowledges the latter in his report.

A possible counterpoint is that mapmakers targeted the district's largest county, Charleston, and the largest precincts, given the requirement that the district shed roughly 88,000 voters. If so, perhaps this explains why Black and Biden voters were disproportionately drawn out of the district. My analysis dispels this possibility, however. In fact, because the Total VAP variable is statistically significant and negative in the model, the results reveal that, on balance, mapmakers were more likely to remove from the 1st district VTDs with smaller total populations.

We can see these racial and partisan disparities in a simple scatterplot. Figure 1 below arranges the VTDs in the 1st district prior to redistricting based on their Biden vote (on the x-axis) and BVAP (y-axis). As a reference point, the figure includes two lines at 1000 persons on each axis. Green dots indicate VTDs kept in the district while red dots indicate VTDs that were drawn out. In total, there were 369 precincts in the 1st district prior to redistricting, with sixty-five removed by the redrawn map. So, the baseline probability that any given VTD was drawn out of the district is 17.6%.

One way to read Figure 1 is to look at each quadrant. In the lower left quadrant, there are 339 VTDs with <1000 Biden and Black voters. Among them, 52 (15.3%) were drawn out of the district. In other words, precincts with the fewest Biden and Black voters were less likely to be removed from the district compared to the baseline. At the other extreme, in the upper right quadrant there are five VTDs with > 1000 Biden and Black voters. Among them, four (80%) were drawn out of the district. In the lower right quadrant, there are seventeen VTDs with >1000 Biden voters but <1000 Black voters. Although just five of them were removed from the district, the percentage (29.4%) is roughly twice the baseline. Finally, in the upper left quadrant, there are eight VTDs with <1000 Biden voters but >1000 Black voters. Among them, four (50%) were drawn out of the district, approximately three times the baseline.



Another way to read Figure 1 is to look at either side of the reference lines (rather than the four quadrants). On the right side, there are twenty-two VTDs in the 1st district with >1000 Biden voters, nine of which (41%) were drawn out of the district. By comparison, fifty-six out of 347 VTDs with <1000 Biden voters (16%) were removed. In the top of the figure, there are thirteen VTDs in the 1st district with >1000 Black voters, eight of which (62%) were drawn out of the district. By comparison, fifty-seven out of 356 VTDs with <1000 Black voters (16%) were drawn out. Notably, we can see that the four precincts with the largest BVAP in the 1st district were all removed from the district. According to these data, the racial composition of a precinct was a stronger predictor of whether it was removed from the 1st district than its partisan composition.

I examined other reference points to evaluate the robustness of the above results. I find the same patterns. For example, 21% of VTDs in the 1st district with >500 Biden voters were drawn out of the district compared to 14% for VTDs with <500 Biden voters, while 26% of VTDs with >500 Black voters were drawn out of the district compared to 15% of VTDs with <500 Black voters.

As a final matter, the other statistic Trende relies on in his report is the BVAP in the 1st district before and after redistricting. Trende concludes that the enacted plan produces “almost no change” in the district’s Black voting age population (pg. 22). According to his Table 7, the district’s BVAP shifts from 16.6% under the old map to 16.7% in the redrawn map (pg. 22). Although we use slightly different measures in our respective reports, my data confirm this modest change.¹⁴ Table 4, below, presents my estimate of the Black voting age population for each of the districts before and after redistricting. According to my data, there is a 0.1% increase in the BVAP in the 1st district, nearly identical to Trende’s estimate.¹⁵

¹⁴ I obtain my data on race from the 2020 Census: <http://data.census.gov/>. See table “P3: Race for the Population 18 and Over.” I include in my measure any person who self-identified as Black, including Black in combination with any other category. Trende uses the non-Hispanic Black population.

¹⁵ Although Trende lists the old and new BVAPs as 16.6% and 16.7%, respectively, he cites a 0.2% difference in the third column of his table (pg. 22). No doubt this discrepancy is due to rounding. My estimate, by comparison, rounds down to 0.1%, so practically speaking our estimates are the same.

Table 4: BVAP Change

<u>District</u>	<u>BVAP (Old)</u>	<u>BVAP (New)</u>	<u>BVAP Change</u>
CD #1	17.3	17.4	0.1
CD #2	23.9	25.4	1.5
CD #3	17.4	17.6	0.2
CD #4	18.3	19.0	0.7
CD #5	25.7	24.7	-1.0
CD #6	52.5	46.9	-5.6
CD #7	25.4	25.4	0.0

I believe this comparison suffers from the same flaw noted earlier. Namely, it focuses on the choices mapmakers made and does not consider the choices they could have made. Consider the disparity cited above: that Black voters were 7.0% more likely to be drawn out of the 1st district compared to their percentage in the district prior to redistricting. One way to think about this statistic is in terms of the number of voters removed in excess of strict parity. Namely, if mapmakers drew Black voters out of the district in a proportionate manner, they would number 19,641.¹⁶ Recall that 27,626 Black voters were removed from the district by the redrawn map. In other words, 7,985 additional Black voters were moved out of the 1st district in excess of parity.

Finally, it should be noted that, according to my data, 16,074 Black voters were drawn into the 1st district from the 6th district. On the one hand, this certainly serves to reduce the disparities noted above. However, there are two points to keep in mind. First, on balance the 1st district shed 11,552 more Black voters than it gained from the 6th district. Second, the data indicate that Black voters were less likely to be moved from the 6th district to the 1st when compared to their proportion in the 6th district. Prior to redistricting, 52.5% of the 6th district's voting age population was Black, compared to 37.7% of those drawn into the 1st district. As a result, 6,332 fewer Black voters were moved from the 6th district into the 1st district than would be considered proportionate.¹⁷ If we combine this number with the 7,985 Black voters who were disproportionately removed from the 1st district, the BVAP in the 1st district would be 19.9%.

All in all, although the Black voting age population hardly changes under the redrawn map, the BVAP in the 1st district could be higher if Black voters were moved between the 1st and 6th districts in a proportionate manner. In his report, Trende acknowledges that the redrawn map alters the partisan composition of the district in a way that “moved the district out of competitive territory and into reliably Republican territory” (pg. 35). I would simply add that the racial composition of the redrawn district contributes to this pattern.

¹⁶ As noted elsewhere in this report, the BVAP prior to redistricting is 17.3%, and 113,531 residents of voting age were removed from the 1st district.

¹⁷ According to the data, 42,679 voting age residents were moved from the 1st district to the 6th district. With a BVAP of 52.5%, this translates to 22,406 voters who would be drawn into the 1st under strict parity.

I declare under penalty of perjury that the foregoing is true and correct.



Dr. Jordan Ragusa
May 4, 2022
Charleston, South Carolina